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Review

Diverse facets of cortical interneuron migration regulation - implications of neuronal activity and epigenetics

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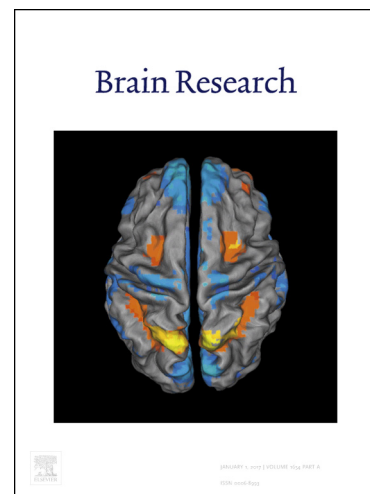
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## **Diverse facets of cortical interneuron migration regulation - implications of neuronal activity and epigenetics**

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### **Abstract**

The proper function of the cerebral cortex relies on the delicate balance of excitation and inhibition determined by the accurate number and subtype composition of the diverse group of inhibitory gamma-aminobutyric (GABA)-expressing interneurons. Developmental defects can lead to impaired cortical inhibition and seem implicated in neuropsychiatric disorders like schizophrenia.

The multifaceted development of cortical interneurons, of which the long-range migration from the basal telencephalon to cortical targets represents a critical step, is orchestrated by various intrinsic and extrinsic factors. Besides motogenic factors, neuronal activity determined by neurotransmitter and calcium signaling turned out as a crucial driver of cortical interneuron motility and migration, whereas the directionality is orchestrated by specific guidance receptors. Thereby, the responses towards different guidance and neurotransmitters cues appear highly stage and cell type-specific, relying on a complex transcriptional network that instruct the expression of particular receptor combinations. The contribution of epigenetic mechanisms to gene expression control that direct cortical interneuron migration and maturation are now beginning to be approached. This is key to decipher interneuron subtype-specific developmental programs and helps to understand how

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